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U.S. PUBLIC HEALTH SERVICE

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THE SCIENTIFIC EXHIBIT
"THE STORY OF LIFE", AT THE TEXAS
CENTENNIAL EXPOSITION, DALLAS,
TEX., JUNE 6-NOVEMBER 29, 1936

BY

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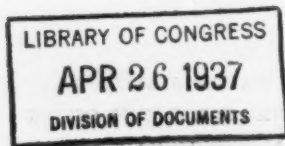
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**THE SCIENTIFIC EXHIBIT, "THE STORY OF LIFE", AT
THE TEXAS CENTENNIAL EXPOSITION, DALLAS,
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By PAUL T. ERICKSON, *Assistant Surgeon, United States Public Health Service*

Introduction and General Description

At the request of the Commissioner General of the United States Texas Centennial Commission, the United States Public Health Service undertook the planning, coordination, and preparation of the scientific exhibit designated "The Story of Life", housed in the Federal Building at the Texas Centennial Exposition. A medical officer, Asst. Surg. Gen. R. C. Williams, was designated as the representative of the Public Health Service in this work. Inasmuch as the occasion for the exposition was the celebration of the one hundredth anniversary of the independence of Texas, it was felt that the exhibits should relate largely to Texas; and it was deemed appropriate and desirable to secure the cooperation and assistance of the leading Texas educational institutions in preparing certain exhibits. These were readily obtained.

In order to plan the exhibit an advisory committee was appointed, consisting of Surg. Gen. Thomas Parran and Dr. E. H. Cary, of Dallas, cochairman; Charles G. Abbott, Secretary of the Smithsonian Institution; H. Y. Benedict, president of the University of Texas, Austin; and Dr. Eben J. Carey, dean of Marquette University Medical School, Milwaukee, Wis.

Through the excellent cooperation obtained from the Texas institutions, the exhibit was installed on time and ready for the opening of the exposition on June 6, 1936. After installation and until the closing of the exposition, the exhibit was under the immediate charge of Asst. Surg. Paul T. Erickson, of the Public Health Service.

Funds for this exhibit were allotted by the Commissioner General to the Public Health Service, which, in turn, made the allocation to the various cooperating institutions. A direct allotment was made by the Commissioner to the Smithsonian Institution.

In addition to the above-mentioned participants, exhibits were also contributed by the American Medical Association, the American Pharmaceutical Association, the American Dental Association, and the Texas Graduate Nurses Association. Thus, the scientific exhibit represented the work of the United States Public Health Service and

the Smithsonian Institution, together with that of seven Texas schools or institutions, and the above-mentioned professional organizations. The Texas schools or institutions which participated were: Texas University, Austin, and the medical branch at Galveston; Texas Agricultural and Mechanical College, College Station; Rice Institute, Houston; Southern Methodist University, Dallas; the Texas Christian University, Fort Worth; Baylor University, Waco, and Baylor Medical College, Dallas; and the Texas State College for Women, Denton. The various exhibits were coordinated and their preparation and installation supervised by the United States Public Health Service, and the exhibits remained in charge of that organization.

The exhibit was prepared with the idea of presenting visually, in a popular way, life in its various forms and aspects. This varied story began with a practical and realistic presentation showing how geological investigations are actually carried out by the Smithsonian Institution. From this prehistoric aspect of life the story was carried through the evolution of plant and animal life and finally to and including man. It gave an account of the part that chemistry plays in life, and of the fact that certain foods contain substances called vitamins, the chemistry of which is relatively unknown, which are essential to living things as a regulator of body processes. It presented the structure and function of plants, animals, and man, and the unusually interesting facts concerned in the functions of the mind, especially in the psycho-physiology of vision; it showed how the characteristics of living things are changed through the processes of heredity; it included the diseases of man, animals, and plants, and the methods developed by man for preventing and treating them for the preservation of life; and, finally, it showed the marked progress made by physicians, dentists, pharmacists, and nurses in administering proper care and treatment to those who are in need of their services.

"The Story of Life" was located in the south end of the Federal Building and occupied a gross floor space of 10,400 square feet. When the exhibit was planned, it was foreseen that, because of the large number of organizations participating, the space for each organization would be limited. With this limitation in mind, and as the exhibits related largely to Texas, the greater portion of the space was allotted to the Texas institutions. The exhibit proper of the United States Public Health Service occupied 1,740 square feet (fig. 1), the Smithsonian Institution (fig. 2) approximately 800 square feet, and the remainder was divided among the various Texas institutions and the national organizations of medicine, dentistry, and pharmacy.

The exhibit space was rectangular in shape, with two entrances on the north side connecting the exhibit with the remainder of the

Federal Building, and one entrance from the outside on the east side facing the Centennial Cotton Bowl. The interior architecture and decorations corresponded with those of the Federal building in general, the walls and ceiling being painted gray, with a 3-foot maroon dado. The floor was a black asphalt composition. On the floor a white stripe 3 feet in width extended from each entrance on the north side into the exhibit space proper for approximately 25 feet, where the two white stripes were connected with another similar stripe. The ceiling carried a blue stripe of the same size in the same relative position. The exhibit proper of the United States Public Health Service occupied the central position, bounded on three sides by the white floor stripe. Grouped around this central exhibit were those of the various other organizations which participated in presenting "The Story of Life."

The exhibit as a whole was largely of the passive or museum type. However, where appropriate, active, moving or mechanical devices were installed. These mechanical features were of much popular interest and attracted visitors to the exhibit. Motion pictures and automatic balopticon slides were shown where the story could best be told by these means. The story of the Texas fever tick, local health work, rabies, and dental education were some of the features shown by motion pictures or automatic balopticons.

The enlarged wax models of the various intestinal parasites of man and animals attracted a great deal of attention, even that of the casual observer. It, no doubt, left a much clearer conception in the minds of the visitors of the role which intestinal parasites play in human and animal diseases.

Moving illuminated cards carrying printed matter and suitably illustrated in color as used in the presentation of the problems faced in mental hygiene and the venereal diseases proved to be an effective means of visual education in an exhibit, as indicated from the number of people who stopped to read the moving cards but who were not attracted by stationary cards, charts, or balopticons.

Those who were not attracted by the mere popular presentation of scientific facts through the use of charts, models, movies, and automatic balopticons became interested through some method of stimulation of their curiosity. The demonstrations of how dinosaur bones are recovered from rocks in which they have been encased for millions of years appealed to many; the series of human embryos and fetuses was a great attraction, as were also the actual medical dissections of various parts of the human body; the manipulation of electric switches which brought out visual illusions and other interesting facts in the psycho-physiology of vision proved fascinating to adults as well as to the younger visitors; and the demonstration of the circulation of blood through the web of a frog's foot under a microscope

and the beating heart of a 3-day-old chick embryo appealed to all. Many visitors returned to the exhibit repeatedly to view these features.

The majority of the exhibits were of permanent educational value and can be used for teaching purposes. Charts and pictures were protected in most instances by cases. Selected glass inserted in the cases at a bias prevented the reflection of light, which might have been annoying to the observer.

There were many requests for literature on various subjects. Pamphlets were available on milk sanitation, undulant fever, and the venereal diseases. Numerous inquiries were made regarding the vitamins. The question box in the American Medical Association booth proved exceedingly popular. Many hundreds of questions were received and later answered through the mail.

Under appropriate subtitles, a somewhat detailed description of the scientific exhibit entitled "The Story of Life" follows. The purpose of this description is to furnish a relatively complete record of the exhibit and to set forth the facts shown so that service might be rendered to those who may undertake the preparation of similar exhibits in the future.

Detailed Descriptions of the Exhibits

PREHISTORIC LIFE AND PHYSICAL CONDITIONS

(The Smithsonian Institution)

The actual preparation and restoration of a fossil skeleton of a *Camarasaurus*, a dinosaur that lived in North America 155,000,000 years ago, was the singular outstanding feature in this exhibit. It illustrated different phases of the work involved in removing a dinosaur skeleton from the sandstone in which the fossilized bones were found embedded. This particular fossil skeleton was found near Jensen, Utah. The several portions of the skeleton encased in huge blocks of sandstone were transported to the exposition as they were found originally in the Dinosaur National Monument Quarry. From these blocks of sandstone containing the fossil bones presented in the exhibit, attendants were engaged in chiseling out the bones (fig. 2). Whenever a fossil bone was broken or particles chipped off in the process of removing it from the sandstone, the broken particles were fitted in their original places and fastened together to make that particular bone complete. This was the nature of the work of the attendants in addition to giving out information to the visitors.

In order that the visitor might correlate the different bones recovered from the sandstone blocks as the work progressed, the complete skeleton, natural size, was shown on the back wall by means of a

large photomural, 10 feet by 30 feet in size. The head bones and a number of neck vertebrae were the only bones mounted upon this photomural.

Other features of the exhibit were as follows:

(a) *The Jurassic age in North America*, depicted in a stationary diorama, which visualized in miniature the animals, plants, and physical conditions as they probably were in western North America about 155,000,000 years ago, when the country was inhabited by enormous reptiles known as dinosaurs.

(b) *The Permian age in Texas*.—The life of the Permian geological period as it existed in Texas more than 200,000,000 years ago was depicted in a large mural painting.

(c) *Camarasaurus in the flesh*.—In a mural painting was depicted the probable appearance of the amphibious plant-eating dinosaur whose fossilized bones were found encased in sandstone and were being carefully removed by the attendants in the exhibit.

(d) *Dinosaur National Monument Quarry*.—This was shown by means of a large map of a cross-section of the earth's crust where the dinosaur bones were found. Small photographs on the map showed views around the quarry.

PREHISTORIC TEXAS MAMMALS

(Texas Agricultural and Mechanical College)

Many animals now extinct used to roam the vast expanse which is now Texas. A few specimens of the fossil remains of the animals were displayed in a show case. A map showed the general distribution of prehistoric mammals in Texas as revealed by the finding of their fossil remains. Fossils from the following prehistoric animals were shown:

- (a) *Elephas imperator*.
- (b) *Elephas columbi*.
- (c) *Mastodon americanus*.
- (d) *Gomphotherium productum*.
- (e) *Rhinoceros*.
- (f) *Bison latifrons*.
- (g) *Camel*.
- (h) *Horse*.
- (i) *Dog (Aelurodon simulans)*.

WATER AND LIFE

(Texas Christian University)

It has been said that "the records of geology are mainly the history of the work of water." Evaporation of water from the earth's surface produces clouds which, in return, cause precipitation in the form of rain, hail, or snow. Overflow water is carried to the sea by rivers bringing along tons of sediment. The Mississippi River and its tributaries drain 1,265,000 square miles and annually carry into the Gulf of Mexico 406,250,000 tons of sediment in suspension,

an amount sufficient to cover 1 square mile to a depth of 241.4 feet. An additional 136,620,000 tons are carried in solution. These amounts represent the lowering of the drainage area 1 foot every 3,000 to 4,000 years.

As important as water is in changing the geological structure of this earth, its role in relation to life is even more striking. Water is absolutely essential to life. Growth of agricultural products requires large quantities of water. Food is flavored fuel, mostly water. The human body is composed of 70 percent water by weight. Other interesting facts concerning water are told in this exhibit, as follows:

- (a) *The three states of water*, dependent upon heat content (latent heat).
- (b) *Graph showing expansion of water at the moment it freezes*, explaining why lakes, large ponds, and seas do not freeze solid in winter.
- (c) *The sea as a vast reservoir of chemical compounds*.
- (d) *The amount of sodium chloride in the oceans*.—A model of a modern skyscraper within a glass container with table salt covering up the building to the eleventh floor showed that if all the sodium chloride were recovered from the oceans, it would cover the entire globe to a depth of 112 feet, and only the top of an 11-story building would be visible.
- (e) *Illustrations of the amount of gold in the oceans*.
- (f) *Water content of foods*.
- (g) *Water content of common salts*.
- (h) *Large quantities of water required for the growth of agricultural products*.
- (i) *A map of Texas showing that if water were entirely incompressible the present coast line of Texas would be 116 feet higher than it actually is*.
- (j) *Water and climate*.—Charts illustrating evaporation, clouds, and precipitation.

CHEMISTRY AND LIFE—THE CHEMICAL COMPOSITION OF THE HUMAN BODY

(Texas Christian University)

Grouped around a large figure of a man were actual amounts per 100 pounds of the elements of which the human body is composed, and in addition, actual amounts of the compounds of these elements and their equivalents in common forms. A chart gave the weights of the chemical elements per 100 pounds of body weight and common equivalents.

PLANT LIFE

(Texas Agricultural and Mechanical College)

In the plant exhibit emphasis was placed upon the cotton plant because of its abundance in Texas, but several other plants were also included. The anatomy and physiology of plants were shown, as follows:

- (a) *Swelling of seeds*.—An animal (swine) skull burst by the force of wet swelling seeds contained in a jar was shown, and vials of seeds before and after being wet, showing the amount of swelling.

(b) *Actual force exerted by swelling seed.*—The measured force with which seeds swell was shown on an instrument designed to record the force in pounds per square inch on a balance.

(c) *Variation in size of seeds.*—The smallest seeds are those of the orchid, which are microscopic in size; the largest seed is the coconut.

(d) *Dormant cottonseed.*—A transparency showed the embryo of the seed cut cross-wise and lengthwise with all parts labeled.

(e) *Germination of cottonseed.*—A transparency and vials showed the stages of germination with parts labeled.

(f) *Internal structure of the cotton plant.*—Two labeled transparencies showed the internal structure of the stem and root. Microscopic mounts showed the internal structure of the cotton root and stem.

(g) *The cotton flower.*—A transparency showed two views of the cotton flower. A Riker mount showed the development of the boll.

(h) *Reproduction in cotton and corn.*—This was shown with an automatic balopticon and about 45 slides. The time required was approximately 5 minutes.

DISEASES OF PLANTS

(Texas Agricultural and Mechanical College)

The plant-disease exhibit was planned in general to show the relative cause and effect of diseases on plants as compared with diseases which attack animals or man. Transparencies, pictures, and explanatory charts were used throughout. These showed—

- (a) *Diseases caused by bacteria.*
- (b) *Diseases caused by filterable viruses.*
- (c) *Diseases caused by fungi.*
- (d) *Nonparasitic diseases.*
- (e) *Diseases caused by nematodes.*
- (f) *How plant diseases spread.*
- (g) *How plant diseases are controlled.*

PLANT-INSECT RELATIONS

(Southern Methodist University)

A number of classical examples of the relation of insects to plants was shown in a habitat group. Insects, as is true of other animal life, depend upon plants for their food. However, no other animals bear such intimate and complex relations to plants as insects do. In order that these relations may be carried out, it is necessary that the body parts of insects be specialized or modified for their particular tasks. The exhibits illustrating these relationships showed—

- (a) *Protective coloration.*
- (b) *Insectivorous plants.*
- (c) *Insect pollination.*

TEXAS FLOWERS AND TREES

(Baylor University)

The Texas flowers and trees were presented by means of colored transparencies. The trees and flowering plants which were included

are those conspicuous in central Texas in the early and late spring. A section of a huge live oak was also displayed, with electric bulbs used as pointers to show important structural features and important dates in Texas history. This exhibit included—

(a) *Transparencies showing many Texas flowers and trees.*

(b) *How a tree records history*, illustrated by a section of the huge live oak 6 feet in diameter, that grew on the old Governor Hamilton place in East Austin, at the spot said to have been the camp of a Mexican force retreating from Nacogdoches.

TEXAS FRESH WATER FISH

(Baylor University)

About 25 different native fish, including some minnows, were shown in natural colors. Each specimen was labeled with its common name as well as the scientific name. The paintings in this exhibit included many of the principal food and game fish, as well as several of the bait minnows found in Texas.

TEXAS BIRDS AND SMALL MAMMALS

(Baylor University)

The bird and animal group was representative of the more common and attractive birds and small animals found in Texas. The birds and animals were mounted in suitable positions. The scenery about this group represented different regions of Texas, from the post-oak hills of the central part of the State to the sage hills of the panhandle and the cap rock.

COMPARATIVE ANATOMY

(Texas Agricultural and Mechanical College)

In comparative studies of the structure of animals and man, similarities are noted in the various systems. This similarity is probably most marked in the skeletal system. In this exhibit 4 skeletons were exhibited in a show case. Two of these from animals having horizontal skeletons showed the similarities between the bones of a small grazing animal, the sheep, and those of a flesh-eating animal, the dog. The other two were the vertical skeletons of the chimpanzee and of man. Opportunities were thus afforded the visitor to compare or contrast man's structure with that of lower animals. Transparencies were used to bring out the similarities in structure of the nervous system, the circulatory system, and the digestive system in man and animals.

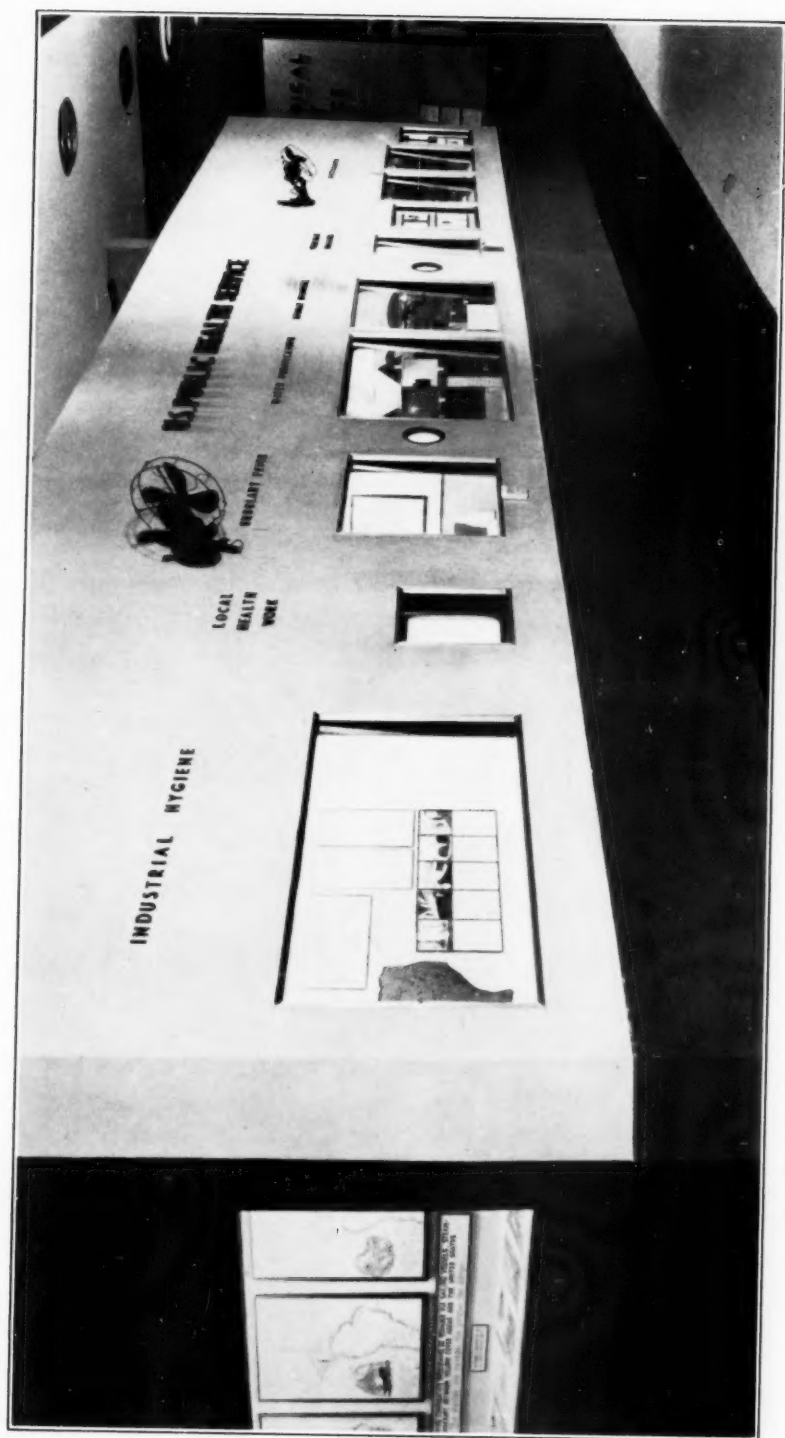


FIGURE 1.—GENERAL VIEW OF PART OF THE UNITED STATES PUBLIC HEALTH SERVICE EXHIBIT.

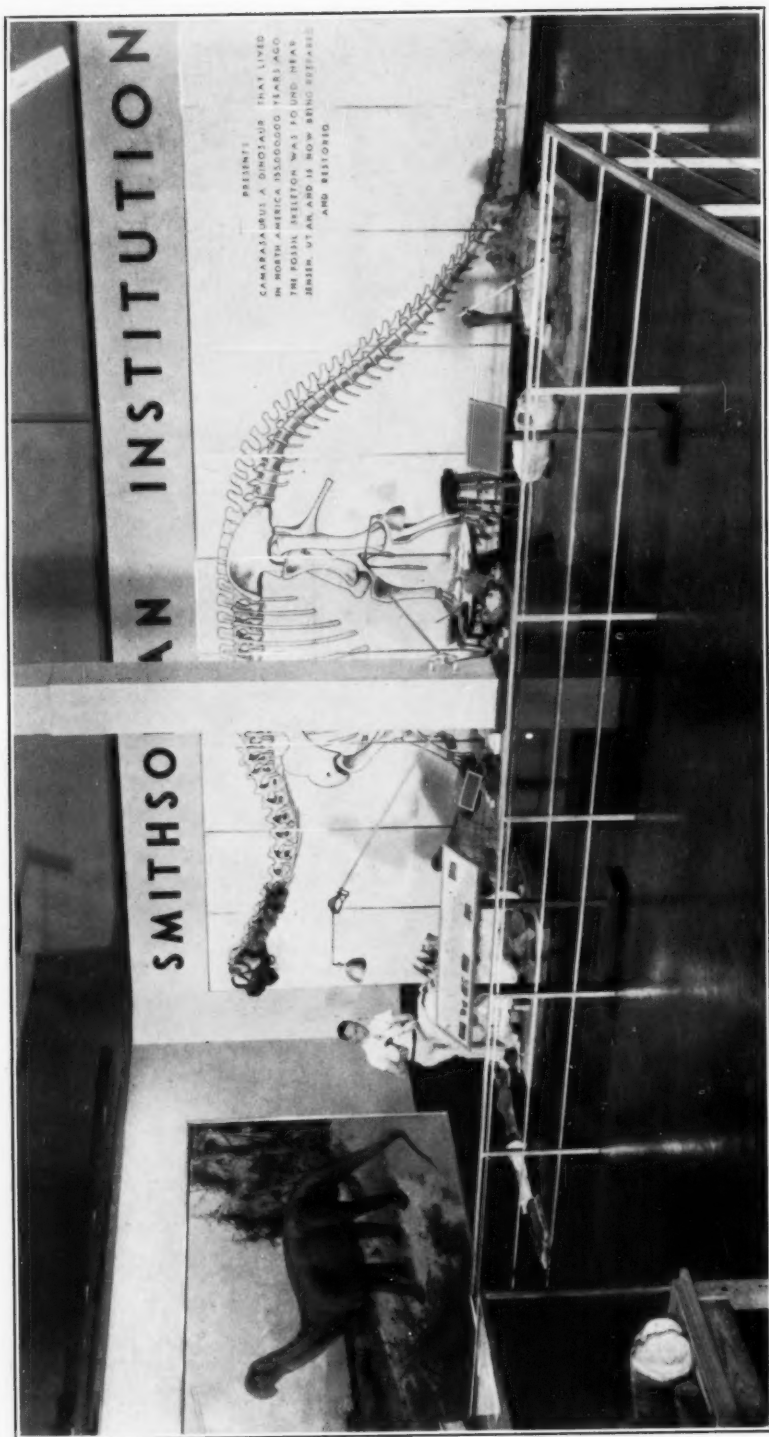


FIGURE 2.—PREPARATION AND RESTORATION OF A DINOSAUR—SMITHSONIAN INSTITUTION EXHIBIT.



FIGURE 3.—PART OF THE ANATOMY AND EMBRYOLOGY EXHIBIT.



FIGURE 4.—WORM PARASITES OF MAN AND ANIMALS. SHOWING LIFE CYCLES AND ACTUAL SPECIMENS OF THESE PARASITES.

FIGURE 4.—WORM PARASITES OF MAN AND ANIMALS, SHOWING LIFE CYCLES AND ACTUAL SPECIMENS OF THESE PARASITES.



FIGURE 5.—MALARIA EXHIBIT, SHOWING MALARIA MOSQUITOES AND METHODS AND RESULTS OF CONTROL MEASURES.

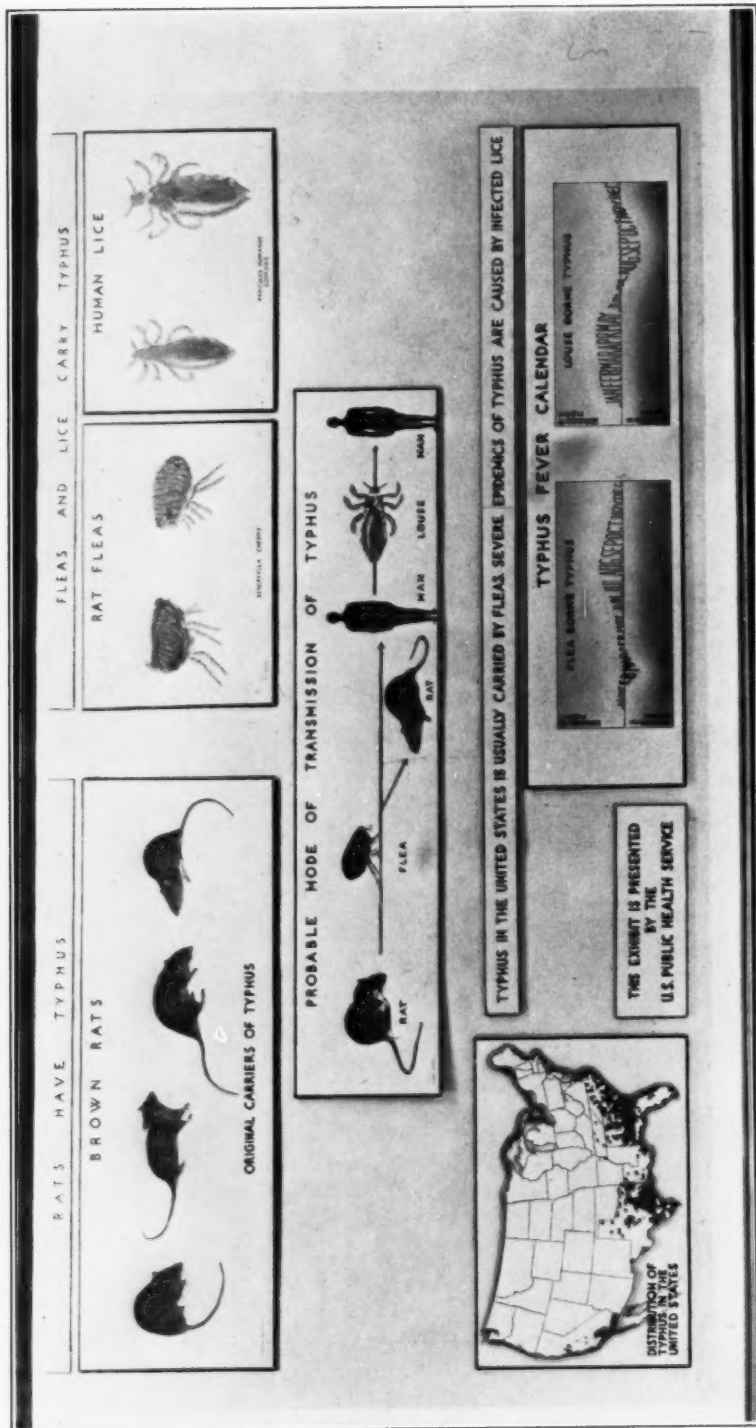


FIGURE 6.—EXHIBIT ON TYPHUS FEVER.

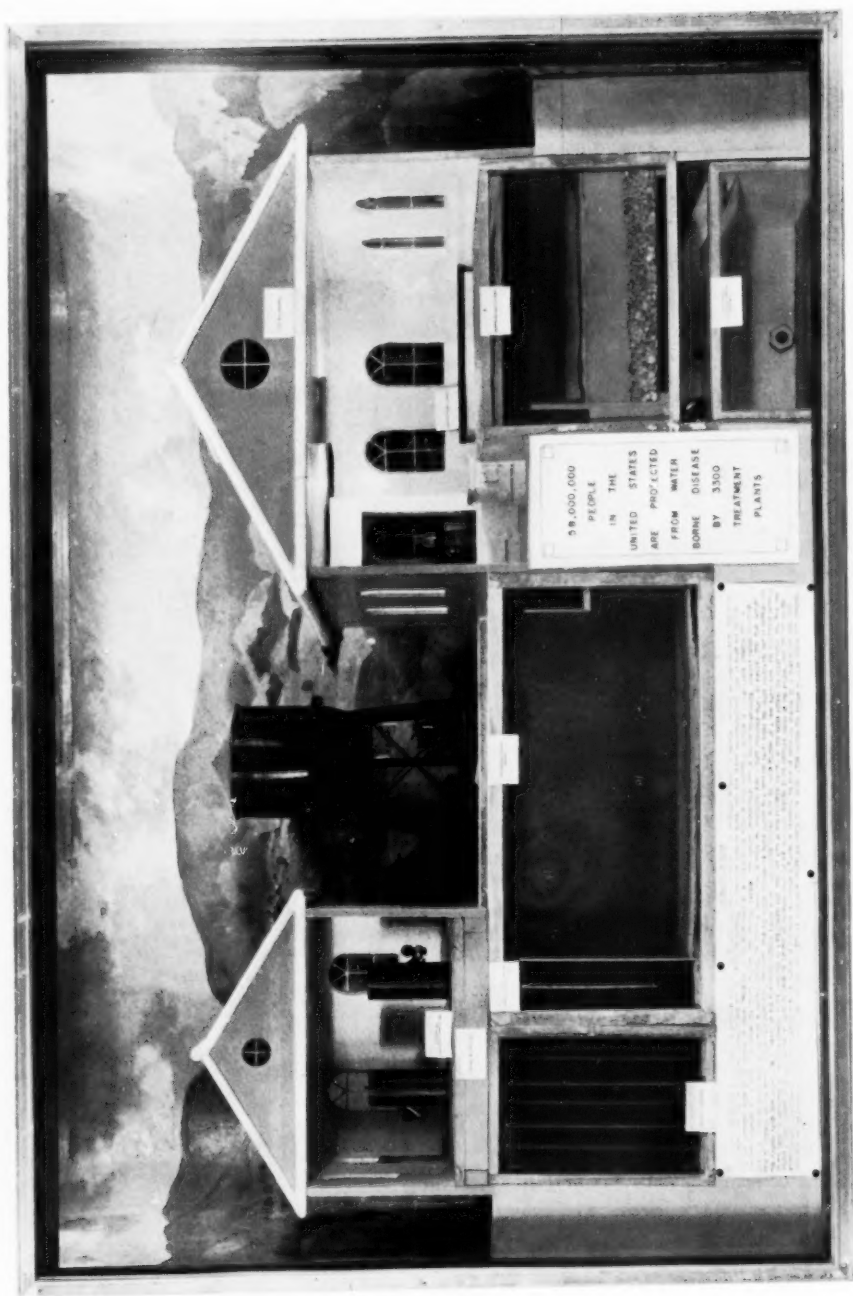


FIGURE 7.—MODEL OF WATER PURIFICATION PLANT.

FIGURE 8.—MODEL OF SEWAGE DISPOSAL PLANT.

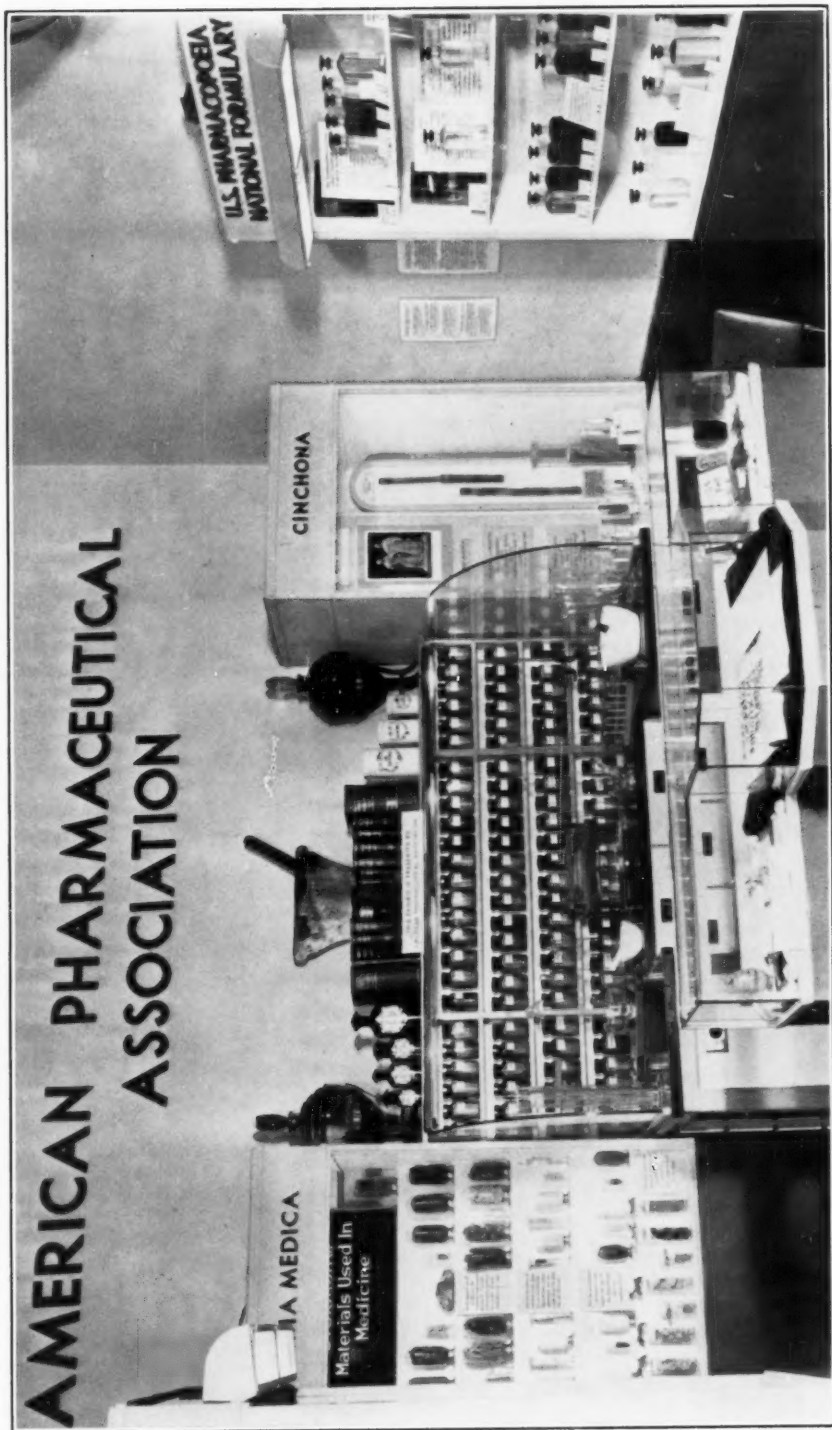


FIGURE 9.—GENERAL VIEW OF THE AMERICAN PHARMACEUTICAL ASSOCIATION EXHIBIT.

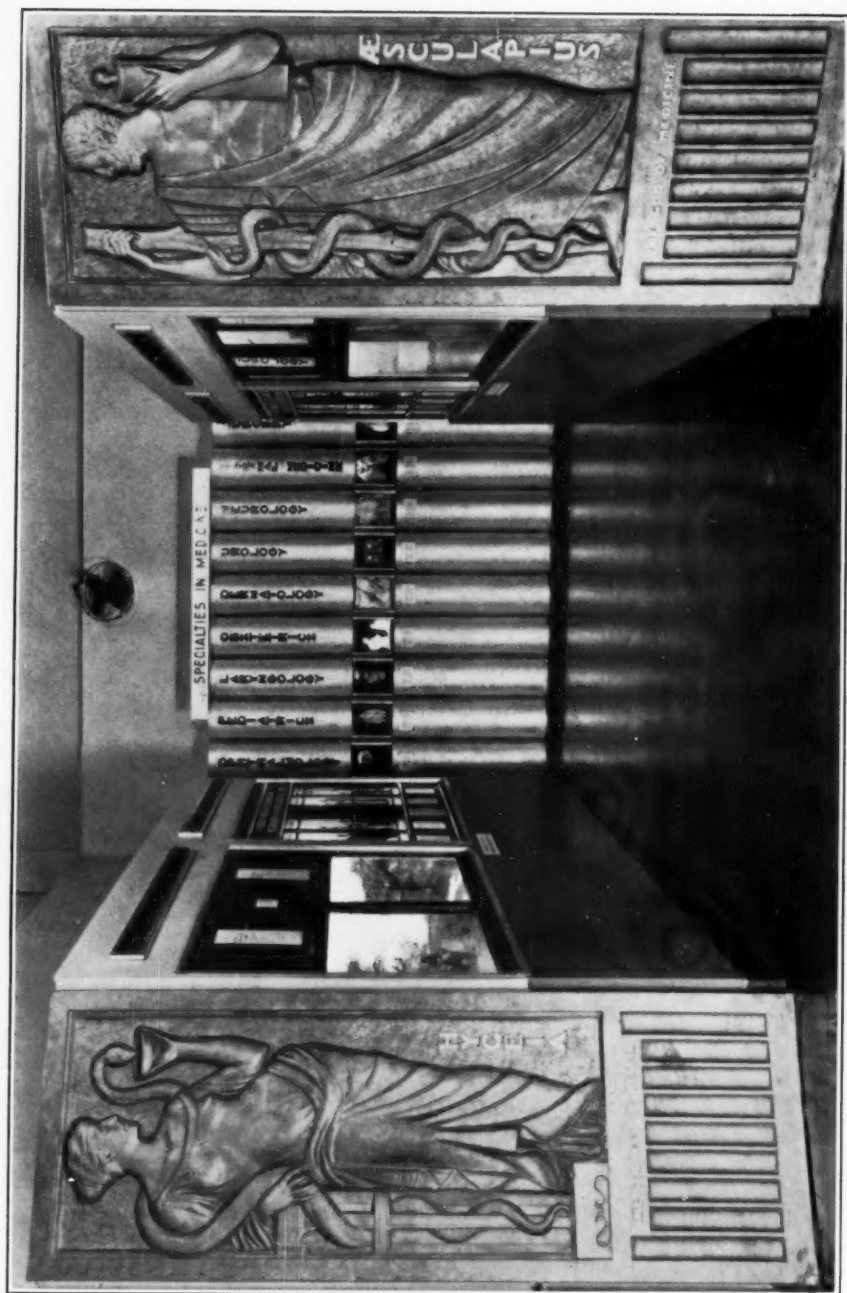


FIGURE 10.—GENERAL VIEW OF THE AMERICAN MEDICAL ASSOCIATION EXHIBIT.

ANATOMY AND EMBRYOLOGY OF MAN

(Baylor Medical School)

A sufficient number of dissections were shown to make the observer acquainted with the more common structures in the human body (fig. 3). The series of human embryos showed the development of the human being from some of the early stages until the time of birth. Development during the first two weeks was not shown. This period is utilized in the development of structures called membranes, which are to be used by the embryo in its various stages of development and after birth of the child are thrown off. This exhibit included the following:

- (a) *Dissection of the complete human nervous system.*
- (b) *Dissection of the sides of the head and neck, chest, and abdomen.*
- (c) *Dissection showing the body sawn through the middle plane.*
- (d) *Dissection showing the pleurae (lung coverings) and peritoneum (lining membrane of abdominal cavity).*
- (e) *Dissection of the spinal cord, showing the origin of the spinal nerves.*
- (f) *Dissection of the arteries, veins, nerves, and muscles of the front of the thigh.*
- (g) *Front view of the dissection of the heart, showing the aorta, the two vena cavae, and the pulmonary artery.*
- (h) *Dissection of the arteries and nerves of the palm and fingers.*
- (i) *Dissection of the muscle tendons of the fingers.*
- (j) *Dissection of the arteries of the back of the foot and the nerves and arteries of the sole of the foot.*
- (k) *Knee joint dissections as seen from the back and front.*
- (l) *Dissection of the deep arteries of the front of the forearm and hand and muscles of the forearm.*
- (m) *Dissection of the side of the head showed the relation of the brain to the skull bones.*
- (n) *Cross sections through eight different levels cut from a frozen body, hand colored and mounted in plaster of paris.*
- (o) *A series of 28 human embryos and fetuses from the early stages to the time of birth.*

PHYSIOLOGY AND PSYCHOLOGY

(Rice Institute)

The physiology and psychology exhibit presented a number of features in a considerable proportion of which the visitor was an active rather than a passive observer. The demonstrations were taken largely from the psycho-physiology of vision. If the visitor was impressed with the great complexity of this sense, one objective of the exhibit was reached. From a study of the exhibit the visitor learned that just what one sees at a given place in the field of vision depends on a large number of conditions, namely, (1) small changes in the

state of the retina and the brain (fluctuations of weak sensations); (2) what one is seeing in other parts of the visual field (contrast, blue arcs); (3) what one has previously seen (after-effect of seen movement, negative after-sensations); (4) the time of exposure of the object seen (subjective colors); and (5) inherited deficiencies of the eye (color-blindness).

In addition, the visitor could see an entoptic phenomenon (that is, he could see structures inside the eye) when he saw the corpuscles of the retinal circulation, and he could learn that the retinal image is inverted and that correct eye movements are necessary for efficient reading. He was also able to test his ability in space perception.

The psychology of hearing was represented by only two features, one demonstrating the difference tone and the other a tone near the upper limit of audibility.

A working model of an insect eye, a beating chick heart, and a demonstration in which the visitor saw blood circulating in the web of a frog's foot lent a dynamic quality to the exhibit. This exhibit included the following:

(a) *Beating heart of a 3-day old chick embryo.*—Eggs were kept in the process of incubation so that one could be shown at all times under a glass which magnified the object about three times.

(b) *Blood circulating in web of frog's foot.*—The frog was anesthetized with 10 percent urethane. (The effects of the anesthetic lasted from 6 to 12 hours.)

(c) *An exhibit showing that the lungs in a bird actually grow out into the hollow bones of the wings.*

(d) *Color-blindness.*

(e) *Large model of the human eye.*

(f) *An optical illusion.*—A wheel with black spots around its periphery at equal intervals rotated in front of an opening in the wall. The movement could be seen in two ways, either as a number of black spots passing by the opening in the wall or as a single spot oscillating up and down in the same space.

(g) *Memory apparatus,* such as is used in the study of learning, presenting one at a time a list of words to be memorized.

(h) *High tones.*—A galton whistle was shown and the visitor was invited to squeeze the bulb on the whistle and listen for the tone, which was near the upper limit of hearing.

(i) *A camera for photographing eye movements.*

(j) *Binocular rivalry.*—A stereoscope which presented blue to one eye and yellow to the other. Since the illumination was low, the colors did not fuse but alternated at regular intervals.

(k) *Mixture of colors in sensation.*

(l) *The blue arcs.*—The visitor looked into a dark box and saw a vertical strip of red light. In addition, he saw momentarily, now and then, four bluish lines radiating from the vertical strip of red light. The cause for this is unknown, but the position of these blue lines corresponds to certain nerve fibers in the retina of the eye.

(m) *The difference tone.*—By pushing buttons the visitor could produce tones of 2,800 and 2,900 vibrations per second. If both tones were sounded together,

a very low tone could be heard. This is the difference tone and is produced in the mechanism of the ear.

(n) *Blood circulating in the retina.*

(o) *The negative after-sensation.*

(p) *Working model of an insect eye-mosaic vision.*

(q) *Test of ability to judge distance.* (The type of apparatus used was that in use by the Army Air Corps to test prospective pilots.)

(r) *Fluctuation of weak sensations.*

(s) *Contrast.*—Shown by a disk with concentric bands of green and gray. When rotated fast the gray part appeared to be pink. The surrounding green made the gray ring look pink, the complementary color of green.

(t) *Color mixture illustrating the difference between the mixture of colors in the brain and by pigments.*—Shown by rotating sectors of yellow and blue on a disk. When rotated, the disk looked gray.

(u) *Seeing colors where they are not.*—A disk with a few concentric black lines on it showed different colors when rotated.

THE STORY OF VITAMINS

(Texas Agricultural and Mechanical College)

The main purpose of the exhibit on vitamins was to show the average person that vitamins are important for his health and well being, and that Texas research workers are contributing toward advancements in this field of knowledge. Emphasis was placed on the fact that a deficiency of vitamins causes diseases and sometimes death.

A peculiar kind of eye disease marked by inflammation and infection, known as xerophthalmia, occurs in children suffering from a lack of vitamin A. Two decades ago many cases were occurring among babies as a result of war conditions. Today xerophthalmia is rare in this country and Europe, since most of the people have a diet containing a reasonable amount of vitamin A. In India, xerophthalmia is still the chief cause of preventable blindness in children. Equally distressing accounts can be given from parts of China, from Yucatan, and from Java, Sumatra, and the Malay States.

Beri-beri is a deficiency disease caused by a lack of vitamin B. It occurs rarely in human beings in this country and Europe, but is widely prevalent in the East (the East Indies, Japan, Siam, and other countries), especially in those places where the staple article of diet is polished rice. In the past, during some years 4 out of every 10 sailors in the Japanese Navy were ill with beri-beri. This is not true today, owing to the brilliant work of Takaki, a young Japanese doctor, who entered his country's Navy in 1872. The disease was entirely stamped out by improving the diet.

For centuries scurvy, a disease caused by a lack of vitamin C, was common, not only among sailors and explorers but also among large

sections of communities in all regions of northern Europe. Today, because of better food habits, scurvy is much less prevalent. Recently a number of investigators have been coming to the conclusion that many adults and children do not take as much fresh fruit and vegetables as they should to get enough vitamin C. These people are not actually ill with scurvy, it is true, but they are the victims of very slight, or partial, or incipient scurvy.

Rickets results from diets inadequate in vitamin D. It is quite common in children in northern climates, where there is little sunshine, but is unknown or comparatively rare in climates where sunshine is abundant.

A lack of vitamin G in the diet may cause a disease known as pellagra, the symptoms of which are dermatitis, diarrhea, and insanity. The dermatitis is the most characteristic feature. Pellagra is rare in farm animals, but it is widely prevalent in humans. In 1930 over 7,000 people died from this disease in the United States. Most of these deaths were in the southern States and largely among Negroes.

The story of vitamins was told by exhibits showing the following:

- (a) *Deficiency of vitamins causes diseases and sometimes death.* (Transparencies illustrating the effects on human beings and the lower animals.)
- (b) *Lack of vitamin A in mother causes defective pigs.* (Six transparencies.)
- (c) *Vitamins essential to growth and production.* (Three display boxes.)
- (d) *Vitamin A bred into corn.* (Two display boxes.)
- (e) *Some good sources of vitamins.* (Six large transparencies showed some vitamin-containing foods.)
- (f) *ABC of vitamins.* (A chart which summarized as briefly and simply as possible the main facts about the vitamins.)

THE STORY OF HEREDITY

(University of Texas)

This exhibit showed the part that heredity plays in life. It was built around a central painting of a fruit fly (vinegar gnat) enlarged about 400 times. The fundamental laws of heredity are the same in a fly as they are in higher forms of life; and the use of the fly makes it possible to study several generations in a short time. Below this large painting of the fruit fly was a model of the "X" sex chromosome greatly enlarged. The genes, the tiny units lying along the chromosomes and controlling all heritable characters, were shown on this large model. Illustrations were given showing how the genes may mutate (change) and thus change the characteristics of living things.

On one side of the central exhibit that gave a graphic idea of what chromosomes and genes are, were shown models of human

cells containing the chromosomes and illustrating how sex is determined. A number of drawings showed how color blindness is a sex-linked inheritance.

On the other side, the mode of inheritance was depicted by drawings illustrating two examples of Mendelian ratios. One of these examples illustrated how the curled wing is inherited in the fruit fly; the other showed how different-colored flowers are produced in the sweet pea.

WORM PARASITES OF MAN AND ANIMALS

(Rice Institute)

This exhibit showed, by means of painted charts, the life cycles of the tapeworm, hookworm, trichina worm, stomach worm of sheep, and the liver fluke. Actual specimens of the various worms in glass vials and enlarged wax models of the different parasites afforded opportunity of study for the student and attracted the eye of the casual observer. Occupying the central position in the exhibit was a large working model which illustrated how the hookworm does its harm in sucking the blood from the human intestine. In this model a greatly enlarged portion of intestinal wall with a male and a female hookworm adhering to the villi was shown. The female was dissected to show the gut through which was pumped a red solution simulating blood (fig. 4). This display included the following exhibits:

- (a) *Life cycle of the tapeworm.* (Wax models and specimens.)
- (b) *Dwarf tapeworm* (*Hymenolepis nana*), the most common human tapeworm.
- (c) *Life cycle of the hookworm* (*Necator americanus*). (A painted chart, specimens, and working model showing hookworm extracting blood from the intestines.)
- (d) *Life cycle of the trichina worm.* (A painted chart showed how rats become infected with trichina by feeding on infected garbage.)
- (e) *Some common parasites of the human intestine.* (Wax models, specimens, and X-ray.)
- (f) *Life cycle of stomach worm of sheep* (*Haemonchus contortus*). (A painted chart and specimen.)
- (g) *Life cycle of liver fluke.* (A painted chart, wax model, and specimens.)
- (h) *Dirofilaria immitis*, which causes a very common infection of dogs in some parts of Texas.

INSECTS OF MEDICAL AND VETERINARY IMPORTANCE

(Baylor Medical School)

In the display of insects of medical and veterinary importance were shown actual specimens of scorpions, ticks, wasps, flies, mosquitoes, ants, centipedes, and beetles. Each insect was mounted in

a small showcase, and a brief statement regarding its importance was given on a small card. These displays included the following:

(a) *Triatoma megista*, a cone-nosed bug recently shown to be the vector of trypanosomiasis (human) in the Pacific States.

(b) *True scorpion (stinging lizard)*.

(c) *Lice*, the transmitting agents of typhus fever in its epidemic form, European relapsing fever, trench fever, surra (a trypanosome disease of horses), trypanosome infections in wild rats, and, in scattered instances, tularaemia.

(d) *Certain wood ticks (Dermacentor sp.)*.—These ticks are not only most troublesome and common of all the ticks attacking man, but they are responsible for the spread of Rocky Mountain spotted fever from animals to man as well as tularaemia and for the occurrence of a puzzling type of paralysis known as "tick paralysis" and at the present time recognized only in the Mountain States.

(e) *Wasps (Vespidae)*.

(f) *Psychodidae (sand flies, owl midges)*, more common to the Asiatic and African tropics and responsible for the transmission of several peculiarly tropical diseases.

(g) *Calliphoridae (blow flies; blue bottle flies)*.—The medical importance of these two flies lies in the fact that they are the source of maggots used in the treatment of chronic osteomyelitis and as mechanical carriers or fomites of numerous filth-bred disease germs.

(h) *The Texas cattle fever tick (Boophilus bovis, Murgaropus annuallus)*.

(i) *Simuliidae (black flies; buffalo gnats)*.—These flies affect man both by their bites and as intermediate hosts to parasites.

(j) *Solpugid*.

(k) *Mutillidae (velvet ants)*.

(l) *Myriapods (thousand-leggers; centipedes)*.

(m) *Dermestids (skin beetles)*.

(n) *Tarantula (Mygale (Eurypelma) texana)*.

(o) *Insect and Arachnid vectors of tularaemia*.

(p) *Vinegaroon (whip scorpion; mule killer)*.

(q) *Mosquitoes (The life history of the Anopheles quadrimaculatus)*.

(r) *Meloidae (blister beetles)*, important because of the severe cutaneous blisters that they are capable of producing.

(s) *Ornithodoros turicata* (the tick vector of relapsing fever of the Southwestern States).

(t) *Amblyomma cajeunense*, an annoying tick of South and Central America and the semitropical region of Texas.

(u) *Rhipicephalus sanguineus (dog tick)*.

(v) *Fleas*, carriers of plague and endemic typhus, and hosts to two species of tape worm (tapeworm of dogs, rats, and mice) of medical interest.

(w) *Haemaphysalis leporis-palustris* (rabbit tick). (Transmits Rocky Mountain spotted fever from rabbit to rabbit.

(x) *Dermacentor variabilis*, the transmitting agent of Rocky Mountain spotted fever in the Southwestern and Southeastern States.

THE STORY OF THE TEXAS FEVER TICK

(Texas Agricultural and Mechanical College)

The story of the Texas fever tick, or fever-carrying tick, is largely a story of outstanding accomplishments by men who applied themselves earnestly to the task of finding the cause of the dreaded cattle

disease that appeared soon after the Civil War. It was through the studies of Theobald Smith concerning the role of the Texas fever tick in the spread of cattle fever that medical science first arrived at the absolute proof of the transmission of disease through insects. This knowledge led to the great discoveries that were subsequently made in the study of malaria and yellow fever.

The story was told by means of pictures, maps, models, and a motion picture film, which included the following displays:

(a) *Picture of an historical trail drive.*

(b) *Pictures of Thomas Say, who in 1821 described a tick taken from deer in East Florida, which became known as the Texas fever tick; John Gamgee, a noted British physician, who searched for the cause of Texas fever in 1868, but failed; cattle showing the work done by the Metropolitan Board of Health of New York searching for the cause of Texas fever in 1868 (without success) (Texas fever had found its way to the municipal slaughter houses of New York City in cattle shipped from the South and West); H. J. Ditmers, who searched for the cause of Texas fever for several years beginning in 1879, but failed; D. E. Salmon, who in 1892 completed the establishment of the Texas fever quarantine line, which was the northern limit of the territory permanently infected by the disease; F. L. Kilborne, who in 1890 proved that the tick is the transmitter of the disease; the causative organisms of two different diseases now known as piroplasmosis and anaplasmosis; Theobald Smith, who discovered the cause of Texas fever in 1889; Cooper Curtis, who worked out the life history of the Texas fever tick in 1891; Mark Francis, who in 1892 built the first device to spray cattle to destroy the tick; and of J. W. Conna-way, who in 1895 joined Mark Francis in cooperative Texas fever experiments.*

(c) *A map of the United States, showing that portion where the tick and fever were indigenous at the time it was discovered in 1890, that the tick was the carrier of Texas fever.*

(d) *A map showing the areas in which the Texas fever tick is still found.*

(e) *A number of pictures showing the cattle-dipping vats built by Mark Francis and R. J. Kleberg and the cooperative experiments made by Francis and Conna-way on dipping.*

(f) *A model of the original derrick used by Dr. M. Francis in 1892 as a spraying device to destroy ticks on cattle, and a model of the first dipping vat ever built to destroy the Texas fever tick.*

(g) *A chart showing how the discovery of the transmission of Texas fever led to the great discoveries made in the studies of malaria, sleeping sickness, and yellow fever, and the contribution of these discoveries to the successful construction of the Panama Canal which had previously failed because of the prevalence of yellow fever in Central America.*

(h) *A motion picture showing the method used to immunize imported cattle against Texas fever and how the tick can be eradicated through cattle dipping.*

DISEASES AFFECTING BOTH MAN AND ANIMALS

(Texas Agricultural and Mechanical College)

Tuberculosis, glanders, anthrax, and rabies were the diseases emphasized in this exhibit. An explanation of each disease was given, followed by pictures illustrating important facts about each disease.

A balopticon showed the important features about rabies. A number of pictures illustrated how pet animals may carry disease, and transparencies gave a few of the diseases common in animals that are transmitted to man. It was also shown how meat and meat products are inspected to safeguard the public health. Included in this exhibit were the following diseases:

(a) *Tuberculosis*, an infectious disease of man and animals that is being eradicated from our livestock because it causes tremendous economic losses and is a great menace to public health. A number of pictures showing how cows are tested for tuberculosis, and a number of actual specimens of organs from cattle showing tuberculosis of the lung, trachea, peritoneum, and lymph nodes.

(b) *Glanders*, an incurable, infectious disease of horses and mules which may be contracted by and is highly fatal to man.

(c) *Anthrax*, showing that proper disposal of carcasses is an essential procedure in safe-guarding the health of man and animals.

(d) *Rabies*, a highly infectious and fatal disease of man and animals which is readily transmitted by the bite of an animal suffering from the disease (balopticon slides).

(e) *How pet animals may carry disease.*

(f) *Diseases common in animals that are transmitted to man.*

THE ENDOCRINES

(Rice Institute)

The endocrine display was centered around a large transparency that showed the location of the more important glands of internal secretion in the human body. A group of charts, having a black background with the lettering in white, were grouped around this large transparency. Actual specimens of the glands of internal secretion were shown. The drugs used in the treatment of endocrine disturbances were displayed.

(a) *Chart No. 1:* A brief and concise description of each of the various glands of internal secretion.

(b) *Chart No. 2:* The chemistry of the hormones.

(c) *Chart No. 3:* The clinical aspect of the endocrine glands (with pictures).

(d) *Chart No. 4:* Results of disturbances of the various glands (with pictures).

(e) *Chart No. 5:* The experimental view point (with pictures).

(f) *Chart No. 6:* Explanation of drugs used in the treatment of endocrine disorders.

DISEASES OF MAN SPREAD BY INSECTS

(U. S. Public Health Service)

Exhibits on malaria, typhus fever, Rocky Mountain spotted fever, and tularaemia showed how insects may spread disease to man.

The malaria display centered around two large models, one depicting a community before and the other after malaria control (fig. 5).

Four maps indicated the distribution of malaria over the United States at four different periods. The affected areas were shown in red. Large drawings of mosquitoes showed *Anopheles* mosquitoes that transmit malaria and other mosquitoes which do not. Colored transparencies illustrated ideal malaria breeding places and the most effective methods for malaria control.

The mode of transmission of typhus fever by human lice and fleas from rats and of Rocky Mountain spotted fever by the Western wood tick and the Eastern dog tick was shown on illustrated placards (fig. 6). The geographical distribution of the two diseases in the United States and the seasonal variation of morbidity rates were also shown.

The relatively recent identification of tularaemia by an officer of the United States Public Health Service and the elucidation of its etiology, prevention, and treatment from beginning to end by American investigators alone were stressed. A map of the United States showed the number of cases reported from the various States during the past 12 years. By means of photographs, paintings, and explanatory charts, the sources of human infection, the disease in various animals, the mode of transmission, the nature of the disease in man, the preventive measures, and the treatment of tularaemia were effectively displayed. This exhibit included the following:

(a) *Malaria control* (models, maps showing prevalence areas, large drawings of mosquitoes which transmit and those which do not transmit malaria, and illustrations of control measures).

(b) *Typhus fever* (two forms, one transmitted by body lice and often occurring in epidemics, and the other which exists in nature in rats and is transmitted to man by rat fleas).

(c) *Spotted fever*, a disease which is transmitted to man by ticks.

(d) *Tularaemia* (pictures, charts, and maps depicting the discovery of the disease by Public Health Service officers, pathology, how the disease is spread, and methods of prevention).

A MILK BORNE DISEASE OF MAN—UNDULANT FEVER

(U. S. Public Health Service)

Undulant fever may be contracted by drinking raw milk from infected cows and goats. It may also be contracted in slaughtering infected hogs and in handling infected fetuses from aborted cows, goats, and hogs. Pasteurized milk is safe. Approximately 80 percent of the United States milk supply is pasteurized. The remainder is consumed raw.

In the exhibit, models of a cow and a goat were shown, suggesting that the source of the infection is mainly from the milk of these two animals. Two milk bottles, one labeled "Raw (dangerous)" and the other "Heated (safe)", suggested the method of prevention

of the disease. In the background was a painting of a herd of cattle grazing. On either side of this painting there was a statement similar to that in the preceding paragraph. Literature on undulant fever was available for the visitors, which gave a short description of the disease and directions for adequate heating of milk which will prevent it.

A DEFICIENCY DISEASE OF MAN—PELLAGRA

(U. S. Public Health Service)

Pellagra was chosen to typify the deficiency diseases in this exhibit. That pellagra is a disease associated with noninclusion in the diet, or nonconsumption, of enough of the pellagra-preventive vitamin was effectively presented to the observer by models of foods which do and foods which do not give protection against the disease. Transparencies showed the relation of pellagra to the disease of black tongue in dogs and the characteristic skin lesions found on the extensor surfaces of the hands, feet, forearms, legs, and neck of human beings with pellagra. Another portion of the exhibit was devoted to an explanation of the seasonal variation of the disease and its distribution in Texas and in the United States. In addition, the exhibit included transparencies showing the prevalence of pellagra in the United States and in Texas and the seasonal prevalence of the disease.

THE VENEREAL DISEASES

(U. S. Public Health Service)

The facts concerning the importance of the venereal diseases as a public health problem and their prevention were told by rotating placards decorated with suitable figures. The part that the venereal diseases play as a grave public health menace was stressed. The importance of these diseases was shown by the large number of venereal disease cases which are reported yearly, and in the statement that a large number of the cases of heart disease and insanity are directly due to syphilis. It was further shown that syphilis is curable in a large majority of the cases. The exhibit afforded an opportunity to urge that sufficient funds be set aside by each local health unit for the purpose of combating the venereal diseases. The following placards were shown:

(a) *Syphilis and gonorrhea are the most prevalent of the serious communicable diseases.*

(b) *Knowledge regarding the prevalence and seriousness of syphilis and the promise of cure that adequate treatment holds should be more generally disseminated.*

(c) *Children should be given instruction in matters pertaining to sex and informed during adolescence regarding the serious consequence of syphilis and gonorrhea.*

(d) *Syphilis is curable in three out of four cases if proper treatment is instituted during the first year and continued until adequate.*

(e) *Only adequate treatment will cure early syphilis.*

(f) *The relapse of syphilis results in the development of complications of great importance to the public health.*

(g) *The transmission of syphilis to the new born child can be prevented in 9 out of 10 cases by giving proper treatment to the mother during gestation.*

(h) *The syphilitic mother should begin treatment before the 5th month of gestation and receive at least 10 injections each of an arsenic compound ("606") and either a bismuth or mercury preparation.*

(i) *When syphilitic mothers are adequately treated they give birth to living children 98 times in every 100. If the syphilitic mother is inadequately treated during pregnancy only 25 percent of the children will be born living.*

(j) *Make sure that the budget of the health department in your community provides sufficient funds to control the venereal diseases.*

(k) *If syphilis is neglected, it is responsible for many crippling diseases during later life.*

(l) *Many people acquire syphilis innocently.*

(m) *Drugs used in the treatment of gonorrhea are not as effective as are those for syphilis.*

(n) *If you suspect that you have a venereal disease, consult a competent physician.*

TUBERCULOSIS

(National Tuberculosis Association)

The exhibit on tuberculosis showed how this disease "runs" in families, that delay in diagnosis of tuberculosis is costly and dangerous, the relation of the number of hospital beds for tuberculosis to the number of deaths in the different States of the United States, and the death rate of the disease at various ages. The exhibit included:

(a) *A chart showing tuberculosis in families—typical case records of actual families.*

(b) *A chart showing that delay in diagnosis is costly and dangerous.*

(c) *The number of beds for and deaths from tuberculosis in the United States 1933-34. (In every community the number of sanatorium beds should be equal at least to the number of deaths from tuberculosis in one year).*

(d) *One-year tuberculosis harvest in the United States.*

INDUSTRIAL DISEASES—INDUSTRIAL HYGIENE

(U. S. Public Health Service)

This exhibit consisted of an outline map of Texas, on which were located the five major industry groups, namely, (1) oil and gas wells, (2) the extraction of other minerals, (3) iron and steel industries, (4) glass, stone, and clay industry, and (5) chemical and allied industries. These groups were located by counties in which more than 100 persons are employed in the respective groups. Five illuminated

placards listed the diseases reported as connected with these five major industry groups. Other placards gave the definition of industrial hygiene and showed what industrial hygiene attempts to do.

The following displays were shown:

(a) *Diseases reported in oil and gas production:* Dermatitis, hydrogen sulphide poisoning, gasoline intoxication, oxygen deficiency, and pneumonia.

(b) *Iron and steel industries:* Pneumonia, heat exhaustion, heat stroke, pneumoconiosis, eye irritations, dermatitis, and cyanogen poisoning.

(c) *Extraction of minerals other than oil and gas:* Pneumoconiosis, rheumatism, heat exhaustion, heat stroke, hookworm infection, mercury poisoning.

(d) *Glass, clay, and stone industry:* Pneumoconiosis, lead poisoning, heat exhaustion, heat stroke, rheumatism, and dermatitis.

(e) *Chemical and allied industries:* Dermatitis, heat exhaustion, heat stroke, bronchitis, poisoning by chemical compounds as lead, chromic acid, and benzol.

MENTAL DISEASES—MENTAL HEALTH

(U. S. Public Health Service)

The problems that we are faced with today in taking care of the mentally ill were outlined and the solutions to these problems were suggested. Rotating or moving illuminated placards (14 placards, 22 inches by 14 inches in size) gave the public a good opportunity to learn the need for prevention in regard to mental diseases through proper and early education of the individual, and the need for proper treatment of those afflicted through the services of well-equipped and well-supervised mental hospitals. The following facts were thus visually presented:

(a) *"Insane" under treatment in public institutions increased from 15,610 in 1850 to 451,672 in 1934; admissions in 1934, 134,237. For every 1,000 persons in a general population there are now 3.75 persons in public institutions for mental disease.*

(b) *No State legislature has kept pace with the needs of the mentally ill.*

(c) *Mental patients suffer from the same diseases and defects as other human beings. Mental hospitals should, therefore, be equipped to meet these needs.*

(d) *All mental hospitals should be designed and equipped to promote and stimulate conventional human relationships.*

(e) *Group occupational therapy stimulates interest, social relationships and recovery.*

(f) *Group and supervised recreation are essential in the modern treatment of the mentally ill.*

(g) *The uses of hydrotherapy have supplanted inhumane restraining and isolation in the modern treatment of the mentally ill.*

(h) *Parents and teachers should never forget that "The child is father to the man", and that he is born into an entirely different world and set of experiences from those which characterized the childhood of these guardians.*

(i) *Repressions in childhood do not make for the development of the best type of personality.*

(j) *Unrestrained self expression on the part of children does not serve in the development of the best type of personality in adult life.*

(k) *It is not difficult to make a child happy; most children will be happy if their minds and bodies are properly treated.*

(l) *An unhappy, disturbed, and disorderly environment does not promote emotional stability in childhood, and may be reflected in faulty traits of character in later development.*

(m) *A happy, tranquil, peaceful environment tends to promote emotional stability in childhood, which is reflected in good traits of character in later life.*

(n) *The prevention of mental illness and the conservation of mental health is a special challenge to medicine and biology, and also to statesmanship, the legal profession, and sociology and education in their broader aspects.*

MOTTLED ENAMEL OF TEETH

(U. S. Public Health Service)

Mottled enamel is an endemic structural defect of the teeth associated with the use of a domestic water containing toxic amounts of fluorides. An exhibit of this condition was included because it is a condition relatively new to the public and is quite prevalent in Texas. Two transparencies contrasted the teeth of a normal child with one who has the characteristic brown stain of mottled enamel. Above the transparency which showed the mottled enamel of a child's teeth was a painting which showed a municipality in Texas receiving its water supply from a deep well, and above the one showing the normal child was a painting of a municipality that secures its water supply from lakes and rivers. Above the paintings were labels explaining that the water supplies containing toxic amounts of fluorides are obtained from deep drilled wells, whereas water obtained from lakes and rivers is free from fluorides. Maps showed the distribution of mottled enamel in Texas and in the United States.

SANITATION

(U. S. Public Health Service)

The production of water and milk supplies free from organisms carrying disease marks one of the greatest strides toward the prevention and eradication of human disease. Three individual exhibits were devoted to the progress that has been made in water purification, sewage disposal, and milk sanitation.

Working models of the modern water-purification and sewage-disposal plants were shown (fig. 7). It was demonstrated how contaminated water is chemically treated with aluminum sulphate to coagulate the suspended organic matter, then run through a filter bed, and finally treated with chlorine to disinfect and remove the last traces of bacterial life that may be present in the water. In the same manner the sewage-disposal model showed how raw sewage, which contains harmful bacteria, is treated to eliminate contamination of wells, rivers, and lakes (fig. 8).

It was also shown how raw milk can be made safe for human consumption through precautionary measures in its production and through pasteurization.

The exhibit also included transparencies, maps showing cities which have adopted the Standard Milk Ordinance recommended by the Public Health Service, and literature.

MARITIME QUARANTINE

(U. S. Public Health Service)

The advent of the modern steamship and aircraft has made more stringent the need for adequate maritime quarantine. This fact was well illustrated by three charts showing comparatively the time of voyages by sailing vessels, steamships, and aircraft between yellow fever areas and the United States. Concentric circles on the charts indicated the average number of days' travel by sailing vessels, steamships, and aircraft between areas where yellow fever has occurred and the United States. The shorter the voyage, the greater the danger. A map showed the locations of the United States maritime, airport, and border quarantine stations in Texas and large photographs of the quarantine stations were displayed.

LOCAL HEALTH WORK

(U. S. Public Health Service)

The purpose of this exhibit was to portray the scope of activities of a whole-time local health unit. It consisted of about 60 slides shown by means of an automatic balopticon. It emphasized the fact that, since government has for its purpose the protection of the general welfare, one way in which it can best perform that function is to protect the general health of the community. This can most effectively be done through the organization of a local health unit.

Slides showed views of a local health office, the health officer and his staff, how the health officer and the public health nurse work in combating typhoid, tuberculosis, syphilis, gonorrhea, and other communicable diseases; malaria control; prenatal and postnatal care; the health of the infant; the preschool child and the school child; the public health nurse and the crippled child; safeguarding milk supplies; inspection of food-handling places; first aid; and other subjects pertinent to public health work.

THE PRINCIPAL CAUSES OF DEATH IN MAN

(University of Texas, Medical Branch)

This exhibit displayed specimens illustrating the disease processes which are the most frequent causes of death in man. The seven most

frequent causes of death, according to the figures available for 1935, were presented. The specimens were all actual human material obtained at autopsy and preserved for study and teaching. With the specimens there were explanatory cards, both in the museum jars and beside them. The following are the seven diseases in this exhibit:

(a) *Heart disease, no. 1 cause of death in 1935, being responsible for 300,000 deaths.*

(b) *Cancer, cause of death no. 2 in 1935, being responsible for 130,000 deaths.*

1. *Specimen showing longitudinal section of the stomach.*

2. *Specimen showing a large cancer of the stomach.*

3. *Specimen showing a normal breast (mammary glands).*

4. *Specimen showing a cancer of the breast.*

(c) *Apoplexy, cause of death no. 3 in 1935, being responsible for 108,000 deaths.* An explanatory placard read as follows: "Strokes are due either to hemorrhage in the brain or to softening of the brain. In both cases there is some destruction of brain tissue. In some instances this is so severe that the person dies soon, in others the damage is less and the individual may return almost to normal. Arteriosclerosis and high blood pressure alone or together are the most frequent causes of 'strokes'."

1. *Specimen of a horizontal section of normal brain.*

2. *Specimen of softening of the brain.*

3. *Specimen of brain hemorrhage, showing the most common location of these hemorrhages and that if patient had survived he would have been paralyzed.*

4. *Specimen of brain hemorrhage at the base of the brain where "vital centers" are located (always fatal).*

(d) *Nephritis (kidney disease), cause of death no. 4 in 1935, being responsible for 106,000 deaths.* A placard explained why kidney function is very necessary for life.

1. *Specimen showing normal kidneys.*

2. *Specimen showing pyonephrosis or pus on kidney.*

3. *Specimen showing acute hemorrhagic nephritis.*

4. *Specimen showing chronic nephritis (Bright's disease).*

(e) *Accidents, cause of death no. 5 in 1935, being responsible for 100,000 deaths.*

1. *Specimen showing injury of brain without skull fracture.*

2. *Specimen showing fracture dislocation of the spine with injury to the spinal cord.*

3. *Normal skull.*

4. *Fractured skull.*

(f) *Pneumonia, cause of death no. 6 in 1935, being responsible for 100,000 deaths.*

1. *Specimen of normal heart and lungs.*

2. *Specimen of lobar pneumonia.*

3. *Specimen of bronchopneumonia.*

(g) *Tuberculosis, cause of death no. 7 in 1935, being responsible for 71,000 deaths.*—The explanatory card read as follows: "Due to intensive education and public health work, the general population knows more about this disease

than about many others. Tuberculosis appears in many forms in different parts of the body. Three of the forms that occur in the lungs are shown here."

1. *Specimen showing miliary tuberculosis.*
2. *Specimen showing chronic ulcerative tuberculosis, the usual type of tuberculosis.*
3. *Specimen showing fibroid phthisis, the type which runs a long slow course because the person builds up a wall of scar tissue almost as fast as the disease progresses.*

DRUGS USED IN THE TREATMENT OF DISEASE

(American Pharmaceutical Association)

The pharmacy exhibit was centered around a prescription case which carried a very complete set of prescription chemicals, utensils used in pharmacy, and a well assorted collection of reference books. On one side of this prescription case was an exhibit showing the evolution of materials used in medicine, and on the other, a cinchona display (fig. 9). Other features were the U. S. Pharmacopoeia and National Formulary galenical preparations and chemicals used in pharmacy.

Fronting the aisle was a show case in which the central attraction was a reproduction of the famous Eber Papyrus. This show case also contained some of the drugs of the Bible and some antique pharmaceutical balances and pill coaters. The display included the following:

(a) *Prescription case*, the focal point of the pharmacy exhibit, placed in the center of the space, the upper section of which provided shelves for approximately seventy-five 200-gm amber bottles, which contained a very complete assortment of prescription chemicals. On the top shelf (above the chemicals) was a large mortar and pestle used as the central background. Grouped around this was a well-assorted collection of reference books, including the United States Pharmacopoeia, XI, American Pharmaceutical Association Recipe Book, the American Medical Association New and Non-Official Remedies, the U. S. Dispensatory, and a number of others.

The lower portion of the prescription case provided storage space accessible by means of sliding doors, for pharmaceutical glassware and other equipment.

(b) *A display of medicinal products which depicted the evolution of the materials used in medicine during the past century.*

(c) *Cinchona display*, consisting of three panels, showing quills of cinchona bark (also known as Peruvian bark), photographs of Sir Ronald Ross and Battista Grassi, co-discoverers of the fact that only mosquitoes communicate malaria, a display of quinine and the numerous salts of quinine, including also salts and preparations of several other alkaloids of cinchona, and 2 glass jars containing cinchona bark exhibited at the 1893 Chicago World's Fair and later at the Century of Progress in Chicago, 1933-34.

(d) *U. S. Pharmacopoeia and National Formulary galenical preparations.*

(e) *Chemicals used in pharmacy*, some 40 specimens of chemicals in eight-ounce, salt-mouth, capped bottles, an assortment representing a considerable

number of the more common chemicals used for their curative value in disease, and some for their utility in the arts.

(f) *Show case, in which the central attraction was a reproduction of the famous Ebers Papyrus, found in a tomb in Egypt in 1862, written about 1550 B. C., and copied from a miscellaneous collection of recipes and remedies the sources of some of which were many centuries older; an assortment of drugs used in Biblical times, with quotations referring to their uses; and a collection of old pharmaceutical balances and pill coaters.*

PROGRESS IN MEDICAL CARE

(American Medical Association)

The entrance to this exhibit was guarded on one side by a large bas-relief of Aesculapius, the God of Medicine, and on the other by one of Hygeia, the Goddess of Health. Explanatory cards described these figures from Greek mythology, which have become the symbols of medicine and health (fig. 10).

Dioramas illustrated the physician's response to calls of illness in former times in contrast with that of modern times, where the physician is almost always within talking distance of his patients. Another set of dioramas showed the medical care in modern hospitals in contrast with the care given a century ago. The doors in the model of the modern hospital opened and closed every 4 seconds, indicating that a patient enters a hospital in the United States every 4 seconds, day and night.

Transparencies and dioramas showed the importance of the periodic health examinations and that self-medication results in poor medical care.

The medical specialties were illustrated by a series of tall pillars representing books, and in the back of each of which was inserted a model illustrating each specialty.

Easily accessible catalogs gave answers to questions regarding medical care in the home and diagnostic aids to the physician. Blanks were available at the exhibit for the purpose of having visitors write down any questions that they wished to have answered and replies were later sent through the mail.

PROGRESS IN DENTAL CARE

(American Dental Association)

The dental exhibit consisted of a series of cases illustrating the work of the orthodontist, the prosthodontist, and the oral surgeon. In addition, there was shown some unusual restorations of historic value, and a moving-picture projector showed films on dental education.

(a) *Portrayal of the part the orthodontist plays in correcting irregularities in the development of normal occlusion, classifying the causes into three main*

divisions—those due to hereditary factors, those due to acquired causes, and those due to irregular habits.

(b) Models, photographs, and facial masks illustrating the part that the prosthodontist plays in correcting exceptionally maldeveloped and malformed teeth, and the restoration of normal facial contours, facial lines, and tooth function by the use of artificial dentures.

(c) Wax profiles of an adult showing normal occlusion in contrast with the effects of extracting the lower first molar early in life, a large wax model of a cross section of a lower molar tooth.

(d) Examples of unusual restorations of historic value, a cast of the mouth of General Winfield Scott, who had one of the largest mouths ever to be recorded, a denture made from natural teeth, and a very old artificial denture vulcanized over a bed of coals.

(e) Portrayal of the part the oral surgeon plays in correcting congenital malformations in and about the mouth, facial masks showing cases of cleft lip before and after correction, and photographs showing steps in the correction of cleft lip and cleft palate.

PROGRESS IN NURSING CARE

(Texas Graduate Nurses Association)

By means of paintings and photographs this exhibit showed the history and development of nursing in Texas and the various fields of activity in which graduate nurses find themselves today.

The development of nursing in Texas was traced from the early times, when Indian women brewed herbs for the treatment of the sick. It showed the early participation of women in caring for the ill and wounded. Out of this grew the home and neighborly nursing. Later came the hospitals for slaves and the volunteer nursing during the Civil War. The marked progress made in nursing during the last half century was shown by the increase in the number of modern schools for nursing. In 1890 there was one school, the original St. Mary's Hospital, as contrasted with 48 schools in 1936.

Photographs were shown illustrating how the graduate nurse may be of service in the medical clinic, in conducting home hygiene classes, in promoting infant welfare, in the control of disease through quarantine, and in various other ways. The different fields of graduate nursing activity were also shown, namely, supervision of nursing, bedside teaching, administration, class-room instruction, private duty, occupational therapy, anesthesia, and the most recent duty of the airway stewardess.

FOOD AND LIFE IN TEXAS

(Texas State College for Women)

This exhibit was devoted to a picturization of the food and life in Texas during important periods of Texas history. Dolls dressed in appropriate costumes represented the various races that have lived in

Texas. The early period of the Indians and explorers, the Spanish era, the Republic, the Old South, and the opening of the valley were consecutively shown. In the background were scenes indicating some of the habits of these people, particularly with reference to food; and on printed cards was furnished information regarding the foods of the times.

YOUR DIET AND YOUR INCOME

(Texas State College for Women)

Tables were set, using food models to indicate different diets consisting of a day's meals representative of each of two different levels of income. On the one level were three meals which cost not more than 50 cents for the quantity needed by a moderately active man weighing 150 pounds; on the other level were shown three meals which cost not more than 25 cents for a similar quantity of food. Texas products were stressed. In the background was shown a food map of Texas in which large centers of production of various commodities were indicated pictorially.

A PIONEER KITCHEN

(Texas State College for Women)

A corner of the pioneer kitchen was shown. The interior was a reproduction of the early homes, and the furnishings were procured from early settlers. One could see here the typical rock fireplace and hearth, the dirt floor, bullet mold, lead dipper, and the rawhide bottom chair. The wooden water bucket with the old gourd dipper was also shown.

Observations and Comment on the Exhibit

Through the experience gained at the exposition, certain items regarding exhibits were noted which, although they may seem obvious when attention is called to them, are often overlooked in the construction and maintenance of exhibits. Only a few will be mentioned here.

One of these is the use of motion pictures and slides shown by automatic balopticons. The ideal situation for the showing of either of these, of course, is in a theater. Such conditions cannot be hoped for in many exhibits, and measures must be contrived to secure the best results. If, in the construction of motion picture and lantern slide features, the conditions which are found in a theater are kept in mind and followed as far as possible, good results will be obtained. For instance, a suitable space should be provided, away from exits or aisles, where people will not stand or walk in front

of the observer to obstruct the view. Benches should be provided for the visitors in order that they might view the picture or slides with comfort, and interest in the exhibit will thereby likely be increased.

A moderate number of seats not only provides for the comfort of the visitors but gives them more of an incentive to remain long enough at an exhibit to learn the lesson it intends to show. These seats should be arranged so that the visitor must face the exhibit—that is, they must be away from the walls; and they should not be too comfortable. Ordinary 2- by 8-foot planks, constructed into benches without a back rest and fastened to the floor, serve the purpose best.

The value of demonstrators in an exhibit has long been established, but one cannot hope for any good results from them unless the exhibit is of the proper type. The essential features are that the exhibit must be active, thus putting the demonstrator in an active setting, and the audience from the beginning must be the passive element.

Where the exhibit is passive and the visitors the active element, little can be expected from the demonstrator. Where seats can be provided, an aid is thus established in providing the passive element in the observers. Without these bare necessities an attendant's function in an exhibit is limited to the answering of questions and the customary function which he naturally assumes by his presence.

Organized lecturing in an exhibit is not workable unless the exhibit has been carefully constructed with that end in view. There must be a limited number of central active attractions (and none other) to which the attention of the audience is directed by the demonstrator. The demonstrator's speech must have been carefully prepared beforehand and be of the proper length and of stimulating interest; and the demonstrator must be well drilled in its presentation. The demonstrator should be uniformed. The wearing of a distinctive band or button is not always satisfactory.

In the construction of wax models for exhibit purposes in warm climates, care must be taken to select a wax of high melting point and to place the models at a sufficient distance from electric lights to avoid melting and distortion.

Many experienced exhibitors made favorable comment concerning the colored calendars used to depict the seasonal variation of diseases. In this exhibit this method was used to show the seasonal variation of typhus fever and Rocky Mountain spotted fever.

The exhibit had a dignified and scientific atmosphere which was especially appreciated by the visiting scientist.

